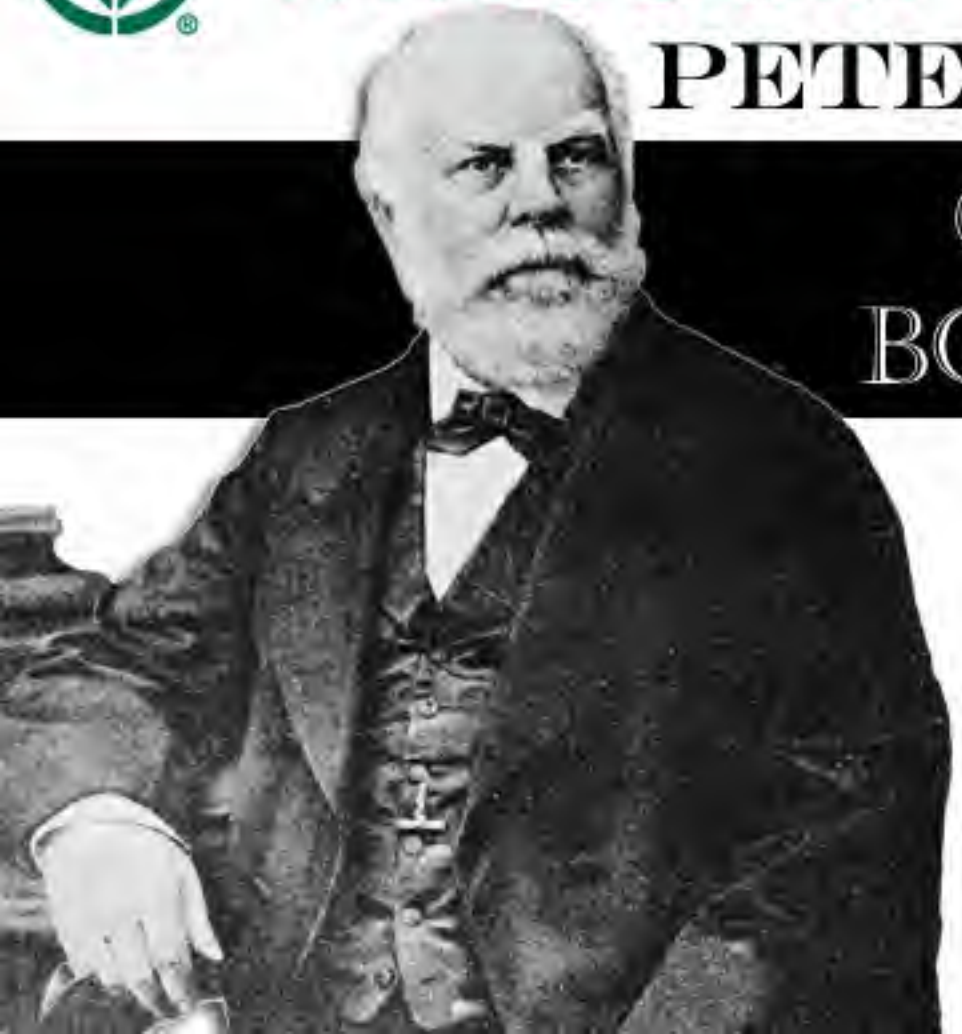
Missouri Botanical Garden
Peter H. Raven Library

George Engelmann Botanical Notebooks



Pagination Note:
Since many of the items lack a specific page number, the page number displayed online refers to the sequentially created number each item was given upon cataloging the materials.

Cambridge Sept 1879

Annales des Sciences Naturelles 5ème Serie, Botanique
tom X, Paris 1869 p. 269 - 304. tab 13-16

Anatomie comparée de la fleur femelle et du fruit des
Cycadées, des Conifères et des Gnétacées par M Ph. Van Tieghem

In Cycadeae the ovules are produced on Leaforgans which are
free from the axis in the first order.

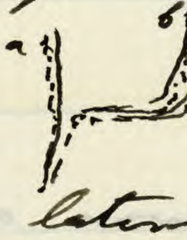
In Coniferae the ovules are never on such Leaforgans of the first order
but always on those of the second order! Essential difference from Cyc.

	Fertile Branch of the second generation ovuliferous Leaf elongated:				of the 3d gen.	of the 4th ge	
	above and below the ovules 1	above the ovules 2	below the ovules 3	neither above nor below 4	neither above 4	nor below 4	
Coniferae Leaf free from the Bract	Pinus 2 Abies 2 Picea 2 Larix 2 Pseudolarix 2 Cedrus 2 Tsuga 2			Ginkgo 2	Phyllocladus 1 Podocarpus 1 Pherosphaera 1 Dacrydium sp. 1	Cephalotaxus 2 Taxus 1	Torreya 1
4							4
Coniferae Leaf adnate to the Bract more or less.	Sequoia 5-7 Athrotaxis 3-5 Sciadopitys 6-9	Cryptomeria 4-5 Glyptostrobus 2 Taxodium 2 Widdringtonia 5-10 Actinostrobus 2 Frenela Callitris 1-2 Libocedrus 2 Thuja 2 Thujopsis 5 Biota 2 Fitzroya 2-3 Fitz-Roya 3 Chamaecyparis 2 Cupressus 6-14 Juniperus 1-3	Araucaria 1 Dammara 1 Cunninghamia 3		Dacrydium sp. 1 Microstachys 1 Lepidothamnus 1 Saxe-Gothaea 1		

(the numbers indicate the number of ovules)

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Le Liber, bast cells ; les trachées, wood cells

In the Conifers the axillary product of the bract, which is the 1st 2d or 3d
like buds with the ovules; it may be connate with the bract, but
their vessels are always unconnected. The leaf (or bract) receives one
single
bundle, which sometimes is split (bifurqué), but where there is an ax.il-
lary product there are always two bundles which separate further below
and enter. This product  the former (a) has the wood cells
forward or upwards, the latter, lateral (turned inward) and at last (in the
fertile scale) backward, so that the wood cells of the bract and the scale
or its supplement are turned towards each other. The Cupressus scale
is therefore turned with its back towards the axis, and bears its ovules on the
back — by folding together in the manner of angiosperms carpels it would
still leave the ovule naked. ; This is Abietineæ, ovules turned down

Sequoia, Athrotaxis and probably Sciadopitys are almost the same,
but scale and bract are almost entirely united; the ovules are at right angle
or almost erect, because the lower part of the scale (below the ovules) does elongate
much less than in the Abietineæ

2, In Cupressineæ, Taxodineæ and Cryptomeria (and so doubt in Glyptostrobus etc.)
the scale or rather its representative tissue is extremely short and does not
lengthen
stretch out, below the ovules so that the ovules must remain erect and seem to arise from
the base of the bract — above the ovules the scale (cupule) lengthens with the bract

3, Ginkgo is essentially like Pinus, only the bract is a full leaf
and the axillary scale or production is elongated into a sort of petiole like org.
bearing the two ovules on Top, just like the ordinary petiole terminates
in a bilobed leaf (or 3-4 ovules, like 3-4 lobes of leaf) ; The difference

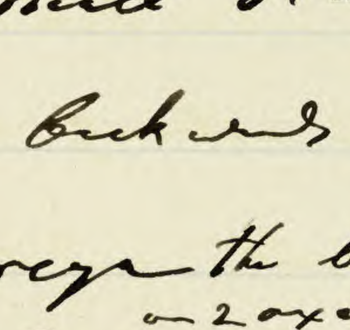
consists in the elongation of the scale below the ovules and not at all above

Thomasia, Lasiopetalum & Commersonia are similar; the scale longitudinal and below the ovules, so that these are placed at its upper end and recurved

4 When the capillary organ does not elongate above nor below, the ovule seems to form its sol representative — Abroma, Theobroma Guazuma.

II In all the Genera of the sect I the extra scale is the first and only product of the bract; — II the axillary product is a bracklet which bears several bracts; one or more of these bracts bear bracklets; this forms a single ovulary leaf (or carpel or scale) This is the case in Cephalotaxus, where two ovules are thus developed — the 3d order, without any elongation of the carpel

In Taxus only 1 bract of 2d order is developed — ovule erect; the secondary bract is opposed to the primary bract (foetida — mihi f; several of succeeding sterile bracts — the shape of small scales follow, which (with their axis) are thrown backwards by the developing ovule

In Torreya the branch — the axil of the original bract bears 6 bracts; only the last of them, collateral to the bearing bract, is fertile  a — the continuation of the axis, a minute flask with after pericarpial elongation and forms a leafy branch, so that the flower is regularly proliferous and the 2 seeds seem to stand

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

16489

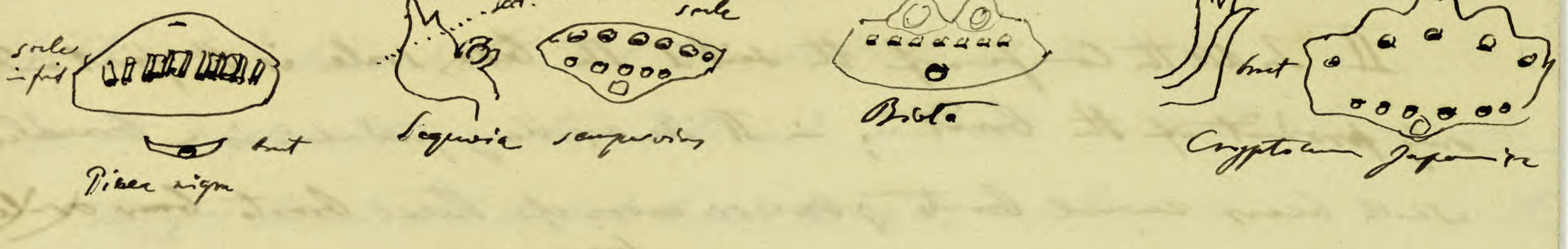
at the base of the branch on both sides.

On the table all the genera to the left of XX are the true Conifers, to the right those with naked seed

all those above the line yy, left, together with those of 4 below yy have 2 anther cells, most all the others have more than 2 cells.

all the former (2 celled anthers) have pollen grains 3-cellular (except Ginkgo & Phyllocladus); all the others have them 1 celled.

[There is a good deal of artificial & forced in these systems & explanations.



bract
wood cells in a bundle

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Bentham to Gray. Sept 16 1879

"Lamina ovulifera" an noncommittal name for carpll
which expresses a theory. No organ in question exists in
the female flower throughout the order. [Lamina seems also
improper, because it is not the same thing as role to which B.
objects] I can not see any thing to confirm the theory that the
lamina is composed of 2 leaves of the axillary bract. —
That it is axillary, and the development of secondary axis, I
readily admit. — I am not prepared to deny R. Brown's
carpellary theory but think the theory of expansion &c
or torus more probable.

Female flowers more important than fruit, which
have thus far been classed more from their fruits

Staminal column, "mainly if not entirely consisting of
united filaments" may or may not enclose a central
axis — as some Euphorbiaceae do, which may or may
not have a rudimentary ovary at the top of the column
In Juniperus the scales (the consolidated bract and ovuliferous
lamina) are slightly open, exposing the erect ovules
but close over them immediately after fecundation
leaving a small cell round each ovule; as the
fruit ripens the inner layer of the scales hardens
into a distinct pyrena round each seed* or in
J. Drupacea into one thick wooden mass with
several cells. The seeds remain free in the cell
quite free from the walls, attached only by the base
and being so completely enclosed, the testa
remains thin. Nor more expanded the seed is
in Conifers, the more its integument appears to
harden and thicken — this most in Juniperus and Taxo-
podium, where it is permanently enclosed — Testa and
Drupaceae in Cephalotaxus, very hard in Dacrydium
where it is quite exposed.

[nothing about the exterior or interior (outer / inner) pollensacks,
in Abies & Cupressineae

*, but how is it where the seed is exserted, as in J. sp.
occidentalis.

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

10490

Kreuznach, 26. Mai 1877.

Heute Nacht ein Uhr verschied nach kurzem Krankenlager an den Folgen einer Lungenentzündung meine innigst geliebte Frau

Amalie, geb. Engelmann

in ihrem 36. Lebensjahre.

Um stille Theilnahme bittet

Julius C. Gräff.

Missouri Botanical Garden
George Engelmann Papers

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
Missouri Botanical Garden

Alexander Dickson in Edinb. new philos Journ.
vol 12. - 1860. p. 228

Bisexual cones of the spruce Abies excelsa

½ or ⅔ of the amount were male, below, ½ or ⅓ female above. The scale-like crest of the anther elongated, the anther cells diminished; "the stamens now resembled one of the bracts of the female cone, indeed, some of the taper crested stamens contained the lower small scales of the female portion in their axils".

The stamens in the lower part of the cone are serially continuous with the bracts of the terminal portion.

The earlier stamens in Conifers form a single male flower and the stamens "correspond to the bracts of the female"

Examined Aug 30 79. a similar monstrous male flower of Tsuga Canadensis in Herb Gray.

Male below, female above

connation of anther changes into a bract, without losing entirely its pollen sacks, and bears in its axil an ovuliferous capillary scale

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

10491

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Celakovsky in Flora 21 Jun 1879

monstrosities have proved that
A Braun was right in establishing
the axiom, that the Metamorphosis
of plants could only be absolved
(absolvirt) by normal (stabile or
axillary) buds

proliferations
A Braun has observed Durchwachsungen
also in Taxodineae and Taxbuds
in place of capellary scales. — But
there may be more than 2 scales; in
Cryptomeria the free teeth of the carpid scale
appear to indicate as many carpels as there

Celakosky declares that the same
holds good in Cupressineae, which have
a capellary scale connate with the bract

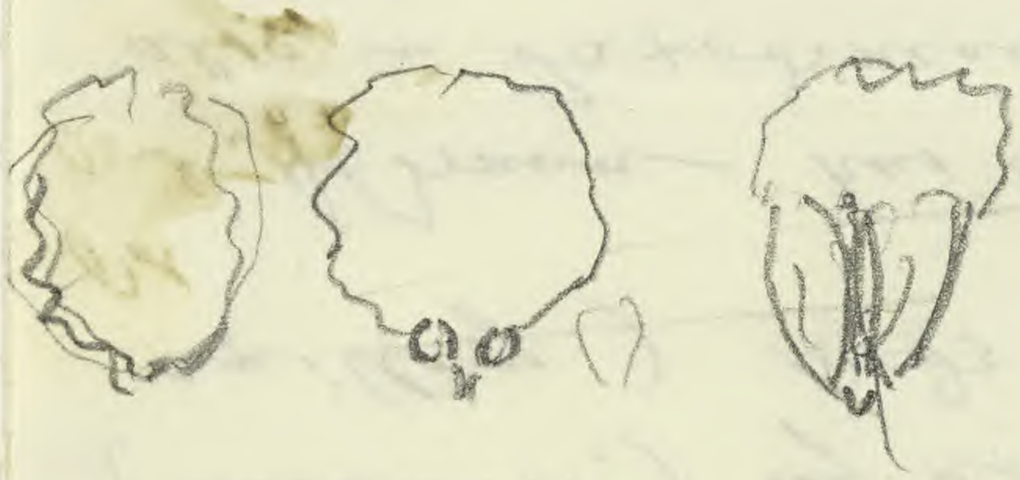
The capellary scale of Cupressineae
is developed only in the second year,
when the fruit begins to enlarge,
though its ovules are already formed
a year before — a most singular
case; but not without analogy,
for according to Payer the 4 ovules of
Cuscuta are already existing (apparently
through = Quadripartition of the end of the axis)
before the carpels arise around their base.
see also the Capsule of Quercus (Eichler)

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

only expecting sheet
with omettings of Myoréa
besa and omettings of
Populus after I pass
very agreably surprised
by the receipt please
and Titles - as well
as by the ample
number -

Yours very truly

C. L. Bebb



MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS
2401

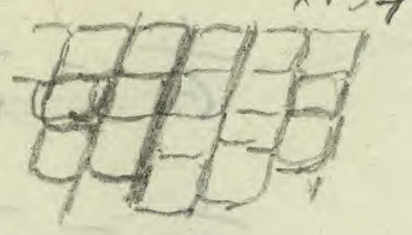
0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

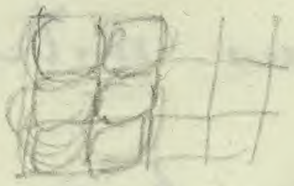
Pinewood from Europe Abies Picea ?

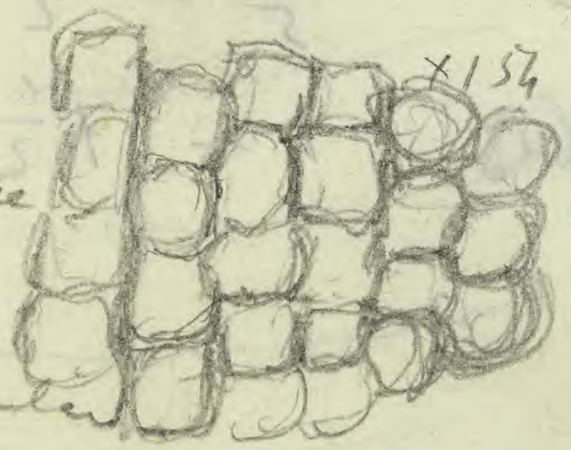
annual rings near the centre 1½ - 2 lines, near the Periphery

$\frac{1}{5} - \frac{1}{2}$ line thick

cells $\frac{1}{75}$ lin diamt







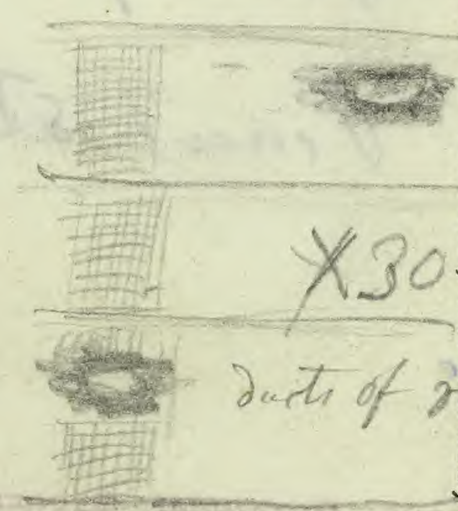
Pinus mitis

our ordinary yellow pine

annual rings $\frac{1}{6} - \frac{1}{3}$ line

cells large & irregular

cells $\frac{1}{50}$ lin diameter



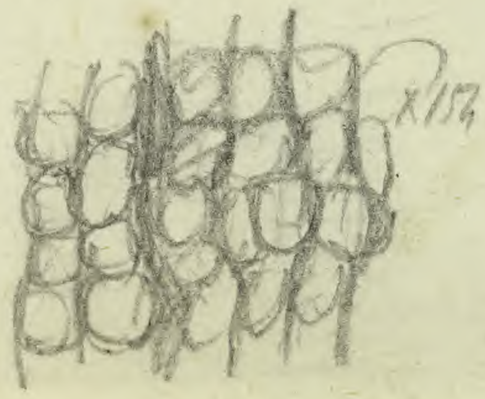
ducts of resin

White Pine ?

annual rings 1 - 1½ lines

cells with irregular

annual rings very solid.



cells $\frac{1}{75}$ lin diam.

over

ARTHUR LEITCH,
APOTHECARY AND CHEMIST,
Sixth and Market streets, St. Louis, Mo.

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

	annual rings	cells.
Pinus aristata	$\frac{1}{60} - \frac{1}{6}$ line	$\frac{1}{140}$ line
Pinus mitis	$\frac{1}{6} - \frac{1}{3}$	$\frac{1}{50}$
Abies picea	$\frac{1}{5} - \frac{1}{2}$	$\frac{1}{75}$
Pinus sylvestris	$1 - 1\frac{1}{2}$	$\frac{1}{75}$

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Berlin Jun 1868

Taxus, Baillon, Adansonia, vol 1 tab 2

f. 13

f. 14

fl. fem (ovule) young

fully developed ovulum

sector of ovary, showing open ostiolum and naked ~~nucleus~~ (Baillon) or nucleus with loose primine, (A. Brown)

The ovule of Cupressus is exactly like that of Taxus; that of Thuya is similar - but these are axillary, not terminal, and without the disc.

Vol 1 Tab. 1 Pinus resinosa, development of fem flower

bract

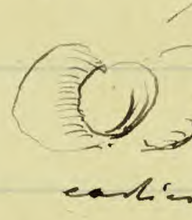
axillary side

inside

very young

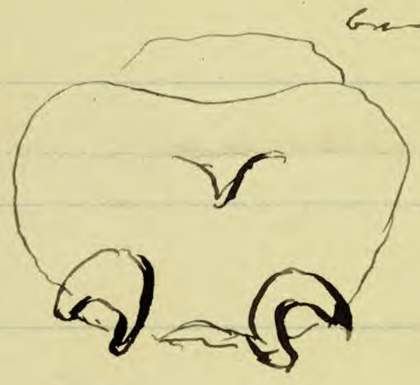
lateral

more advanced showing the ovule & both valves (according to Baillon!) of carpel

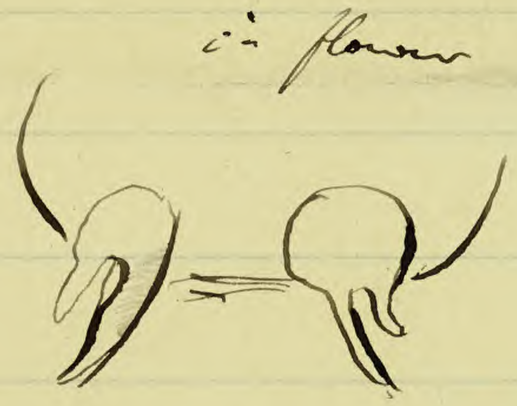


earlier

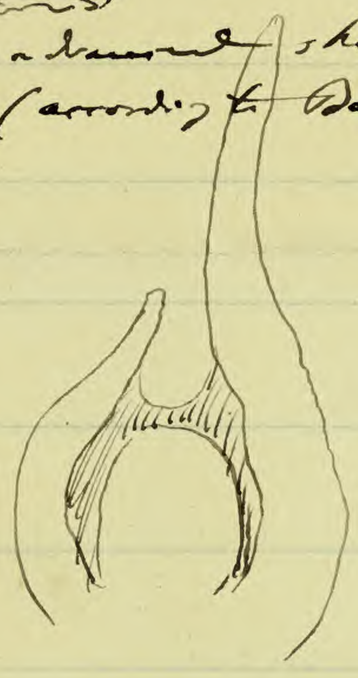
later



bract



in flower



sect of flower in petal or ovary & ovule (Baillon) or ovule with nucleus (A Br.)

compare Mohl

Baillon, vol 2. p. 65 Monstrosity of Pinus excelsa: lower part of female aunt bears stamens and the upper most of these approach in structure the stamens, basis of the female part I begin to bear axillary productions (a fact that was not observed in Richard's case (Mem. Conif. pl. 14) or Schleiden's (Grundzüge der Botanik

10494

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Berlin Jan 1869

Dr H. Baillon, Adansonia Paris, vol 1. 1860-1861 p. 1-16
& tab 1-& 2. Sur la fleur femelle des Conifères

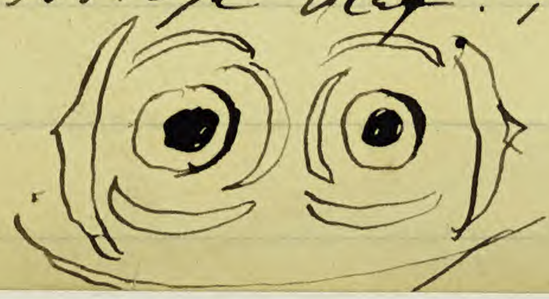
Vol 2 (1861-1862) p. 65-80 3 Memoires sur la fleur des Conifères
par le Dr A Dickson (d' Edimbourg)

vol 5. (1864-1865) pg 1-16 tab 1 sur la fleur femelle
des Conifères. (in part against Caspary)

Organography researches on the nature of the female flowers of the Coniferæ and in defence of the pistillary nature and against gymnospermism. — Vol 1. p. 17 à 21 is a report to the Acad of Sciences, approving this doctrine, which is in fact a repetition of Mirbel's (1815) memoir. pg. 19.... the ovule is an ovarium, the scale of Abietineæ a peduncle, flattened, and that of Cupressineæ a bract.

Torreya [Carpotaxus, Juss. Juss. — Henkel & Hochst. Conif. 865
because there are a Torreya Spreng & a Torreya Arn., the former a Nyctaginea, the latter a Cyperacea]

Baillon vol 1. tab 2



○ is the ovule and ovarium Baillon or nucleus & primina

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

10495

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

1

Coming Aug 19 1879

Staminate in flower

Bract larger bracts shorter & smaller

Thick Capillary scale

Abies
Larix
Pseudotsuga

Picea
Pinus
Tsuga (Hemlock)
Cedrus

Ovules of Conifers secrete a liquid to catch the pollen (Delpino, Strasburger) which in withdrawing draws or sucks the pollen in

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

10496

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Damara

Braun, Poly. embryonie et Berlin 1860, p 243 (note

" On the female cone of Damara I can find no trace of bracts under the sculpturing scales, nor any trace of a possible adnation of bract and carpellary scale" . . .

Here then would be found an absence of the bract — not otherwise found in Coniferae [except Taxus ?] — while others regularly a bract without the scale!

Hofmann Polyembryonie 1860. p. 242

Mehrere wieder sich und mit den beiden Zapfen gemeinschaftlichen (freistehenden) Schuppen Taxodium, Cryptomeria

I will list the Cupressineen. to bract

Ibid. Araucaria has a single, adnate, Pinus 2 connate carpel-scales, free from bract.

Taxodium Cryptomeria and perhaps all Cupressineae have more [than two] carpel scales, connate among themselves and with the bract also Sequoia

ibid p. 243 (= text) They are rather [than carpels or carpellary scales] ovuliferous bracts (Hochblattschuppen) without [carpellary scales seems significant enough] pit cavity, style or stigma

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

	125.	to	100.
adjusted and patent Regulator	100.	to	80.
field	75.	to	60.
	50.	to	40.
	45.	to	35.
	30.	to	25.
	25.	to	20.
Above Watches are all Gents' size.			
Watches	75.	to	60.
"	60.	to	50.
"	45.	to	36.
"	40.	to	30.
"	30.	to	25.
"	22.50	to	18.
Watches reduced from	35.	to	28.
" " "	25.	to	20.
" " "	20.	to	15.
" " "	16.	to	12.
s	35.	to	28.
	25.	to	20.
	20.	to	15.
	16.	to	12.
s	20.	to	15.
	15.	to	10.
	10.	to	7.50
	10.	to	7.50
	7.50	to	5.

on many other goods, not mentioned in this list and would respectfully invite inspection before buying elswhere.

Yours vere respectfully,

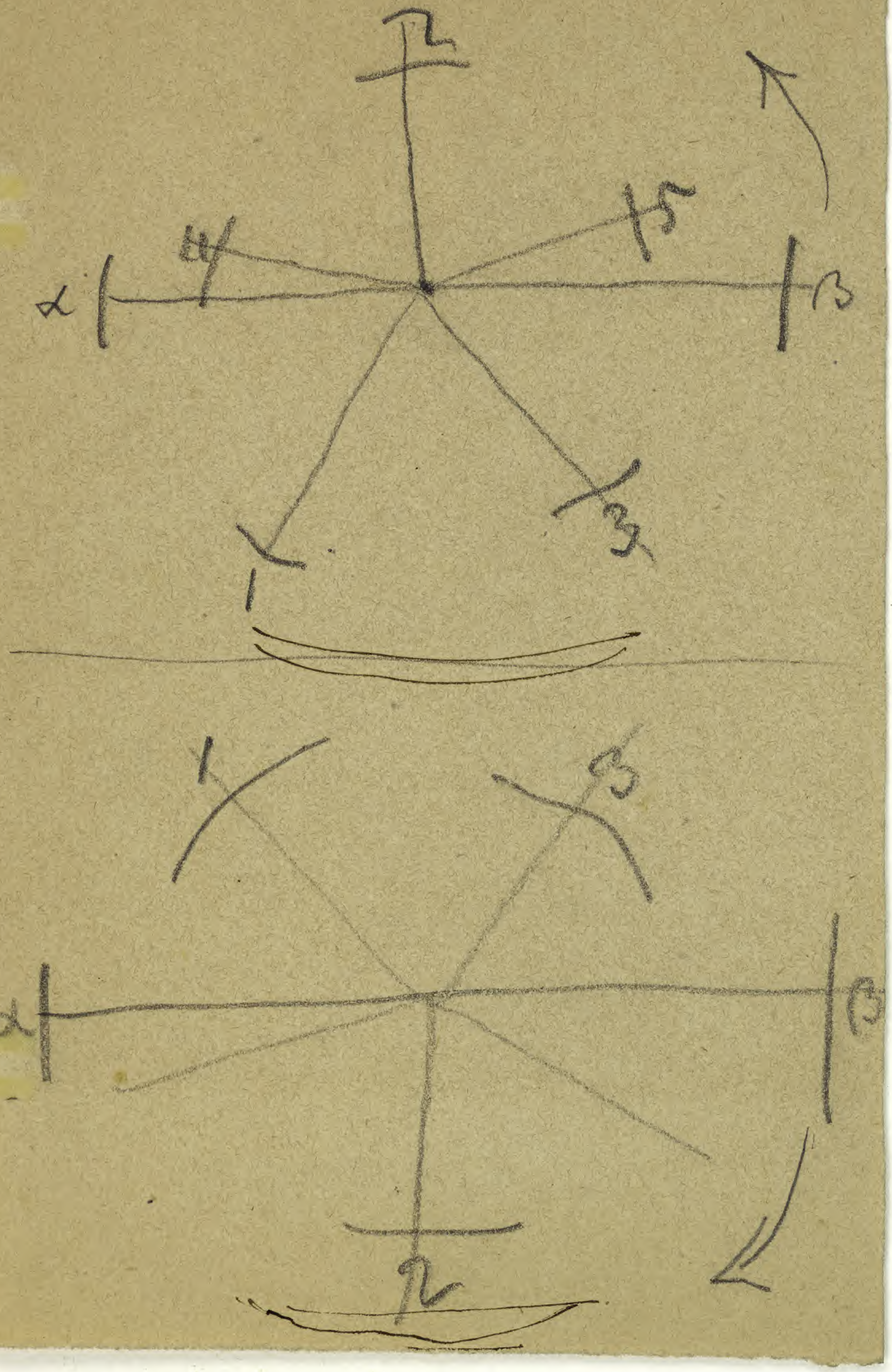
R. JAEGERMANN,

415 PINE ST., BET. 4TH & 5TH, ST. LOUIS

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

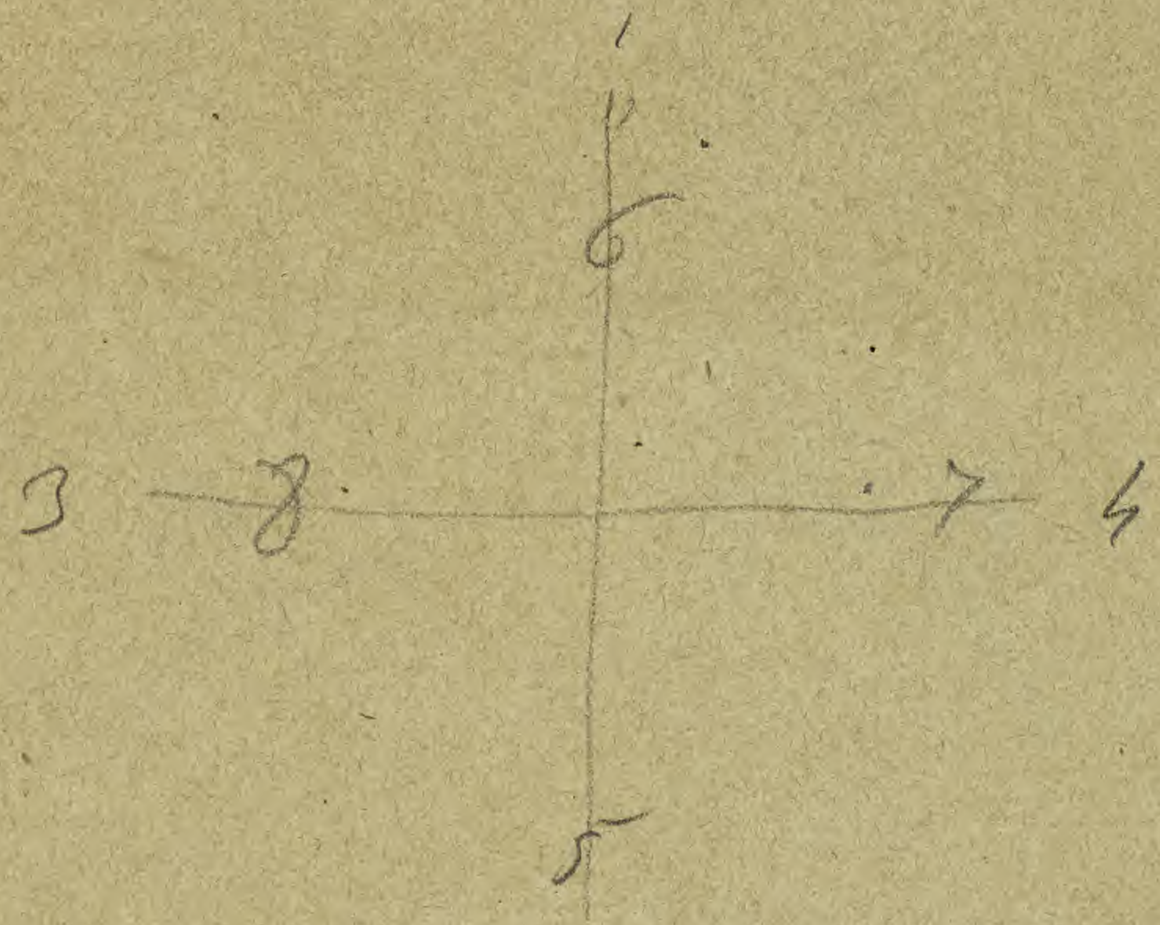
0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

Abschnitt - Coniferen



0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN

10498



MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
MISSOURI BOTANICAL GARDEN